

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-134077
 (43)Date of publication of application : 10.05.2002

(51)Int.Cl.

H01M 2/10
// H05K 5/00

(21)Application number : 2000-320166

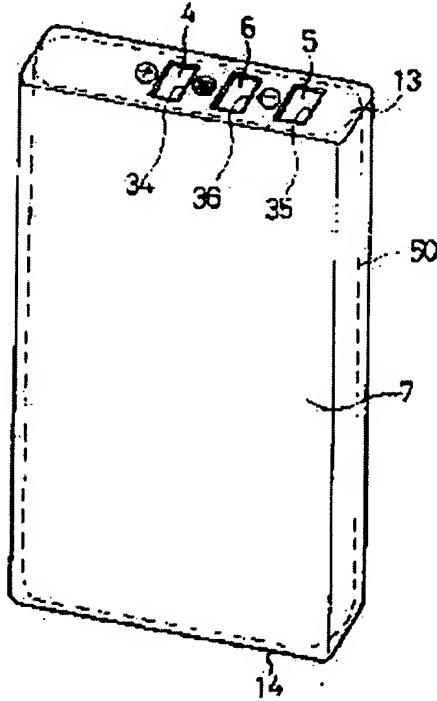
(71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

(22)Date of filing : 20.10.2000

(72)Inventor : IWAZONO YOSHINORI
KONISHI SHOJI
ISHIMARU TAKESHI
(54) SHAPING METHOD OF ARMOR FOR ELECTRIC APPLIANCE
(57)Abstract:

PROBLEM TO BE SOLVED: To provide a shaping method of the armor for electric appliances, by which the armor for electric appliances is shaped into the one with thin, enclosed structure available for miniaturization, dustproof, and dripproof.

SOLUTION: An intermediate finished product 50, consisting of integrally assembled plural components, is placed in a metal mold, which is filled up with a melted resin. The intermediate finished product 50 has an opening 34 to 36, each corresponding to a plus terminal 45, a minus terminal 5, and a temperature detection terminal 6, of which the rim is coated with the resin.


LEGAL STATUS

[Date of request for examination] 26.03.2001

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3614767

[Date of registration] 12.11.2004

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] Combine two or more components with one, prepare an external connection terminal outside, form the middle finished product of an electric product, and this middle finished product is arranged in metal mold. the sheathing object formation approach of the electric product characterize by form a sheathing object in a predetermined dimension configuration by stiffen the resin with which be filled up with the resin of a melting condition and it be filled up in metal mold so that opening might be formed on said external connection terminal and the whole surface might be covered with resin .

[Claim 2] Combine two or more components with one, prepare an external connection terminal outside, and the middle finished product of an electric product is formed. Into the sheathing case where the open section was formed, as said external connection terminal is located, said middle finished product is inserted in said open section side. the sheathing object formation approach of the electric product characterize by make the open section harden the resin with which be filled up with the resin of a melting condition and it be filled up , and close the open section of a sheathing case so that opening may be form on an external connection terminal and the closure of said open section may be carry out by resin .

[Claim 3] Combine two or more components with one, prepare an external connection terminal outside, and the middle finished product of an electric product is formed. Opening is prepared in the location corresponding to said external connection terminal, and said middle finished product is inserted from said open section into the sheathing case where the open section was formed in the direction of arbitration. The sheathing object formation approach of the electric product characterized by making the open section harden the resin with which was filled up with the resin of a melting condition and it was filled up, and closing the open section of a sheathing case.

[Claim 4] Resin is the sheathing object formation approach of an electric product given in claim 1 which is polyamide system adhesives or polyurethane adhesive – 3 any 1 terms.

[Claim 5] Resin is the sheathing object formation approach of an electric product given in claim 1 adjusted so that the degree of hardness after hardening may become low – 4 any 1 terms.

[Claim 6] An electric product is the sheathing object formation approach of an electric product given in claim 1 which is the cell pack which combined with one a rechargeable battery and the circuit board which formed two or more input/output terminals while constituting the cell protection network which protects this rechargeable battery from overcharge, overdischarge, etc. – 5 any 1 terms.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is filled up with the resin which carried out melting so that the component of an electric product might be covered, and relates to the sheathing object formation approach of the electric product which forms the sheathing object of an electric product with the stiffened resin.

[0002]

[Description of the Prior Art] There is no operating environment uniformly, and an electric product like pocket electronic equipment requires protection against dust, a dripproof structure or fall-proof, and shock resistance at the same time a miniaturization, thin-shape-izing, and lightweight-ization are required, since it is accompanied by migration. In order to fill these demands, the structure of the sheathing object of an electric product serves as an important element. Drawing 9 is an example of an electric product, it shows the example of a configuration of the cell pack used as a power source of pocket electronic equipment, held a rechargeable battery 60 and the circuit board 64 which constituted the cell protection network etc. in the sheathing inside of the body, and has met the demand as a power source of pocket electronic equipment.

[0003] The sheathing object of this cell pack consists of pack cases which consist of a bottom case 62 and an upper case 63. As are shown in drawing 9 (a), and the circuit board 64 which constituted the cell protection network in the bottom case 62, an input/output terminal, a connection plate, etc. are arranged and it is shown on it at drawing 9 (b), the rechargeable battery 60 constituted as a rechargeable lithium-ion battery is arranged, and a rechargeable battery 60 is joined to a connection plate. As shown in drawing 9 (c), a double-sided tape 65 is stuck on a cell 60, the upper case 63 is joined to the bottom case 62, and a cell pack is completed.

[0004] Junction in said bottom case 62 and the upper case 63 is made by ultrasonic jointing in both periphery section. As shown in drawing 10, lobe 62a formed in the periphery section of the bottom case 62 is made to insert in crevice 63a formed in the periphery section of the upper case 63, and ultrasonic welding is carried out between the tip of lobe 62a, and the bottom of crevice 63a. The resin fused according to this junction structure is not outside exposed.

[0005]

[Problem(s) to be Solved by the Invention] However, with the configuration of the conventional sheathing object, the structure which joins the divided case was indispensable, and in order to join the upper case 63 to the bottom case 62 in the above-mentioned conventional example, the thickness of the side peripheral surface of both the cases 62 and 63 was needed, and the technical problem by which the increase of the volume as a pack case, i.e., a cell pack, and the increase of weight are accompanied occurred.

[0006] Moreover, the pack case was a hard case, in order to join the upper case 63 to the bottom case 62 and to expose an input/output terminal outside, it was difficult for a minute clearance to occur everywhere and to constitute in protection against dust and a dripproof structure, and it was the structure which is easy to damage by fall.

[0007] The target place has this invention in offering the sheathing object formation approach of an electric product of covering the internal configuration element of an electric product without a clearance with a thin sheathing object, and realizing protection against dust and a dripproof structure with a miniaturization and lightweight-ization.

[0008]

[Means for Solving the Problem] The sheathing object formation approach of the electric product

concerning the 1st invention of this application for attaining the above-mentioned purpose Combine two or more components with one, prepare an external connection terminal outside, form the middle finished product of an electric product, and this middle finished product is arranged in metal mold. it be what be characterize by form a sheathing object in a predetermined dimension configuration by stiffen the resin with which be filled up with the resin of a melting condition and it be filled up in metal mold so that opening might be formed on said external connection terminal and the whole surface might be covered with resin . Since the middle finished product which is the internal configuration element of an electric product is covered with resin, without preparing a joint, the volume of a sheathing object can be formed in the lower limit, and can achieve the miniaturization of an electric product.

[0009] Moreover, the sheathing object formation approach of the electric product concerning the 2nd invention of this application Combine two or more components with one, prepare an external connection terminal outside, and the middle finished product of an electric product is formed. Into the sheathing case where the open section was formed, as said external connection terminal is located, said middle finished product is inserted in said open section side. It is what is characterized by making the open section harden the resin with which was filled up with the resin of a melting condition and it was filled up, and closing the open section of a sheathing case so that opening may be formed on an external connection terminal and the closure of said open section may be carried out by resin. A middle finished product is covered in a sheathing case except for the forming face of an external connection terminal, if opening is prepared in the location of an external connection terminal and the open section of this sheathing case is closed by resin, a sheathing object will be formed in sealing structure and protection against dust and a dripproof structure will be realized with a miniaturization.

[0010] Moreover, the sheathing object formation approach of the electric product concerning the 3rd invention of this application Combine two or more components with one, prepare an external connection terminal outside, and the middle finished product of an electric product is formed. Opening is prepared in the location corresponding to said external connection terminal, and said middle finished product is inserted from said open section into the sheathing case where the open section was formed in the direction of arbitration. It is what is characterized by making the open section harden the resin with which was filled up with the resin of a melting condition and it was filled up, and closing the open section of a sheathing case. Since a middle finished product is covered in a sheathing case except for the open section and an external connection terminal is exposed outside from opening of a sheathing case, if the open section is closed by resin, a sheathing object will be formed in sealing structure and protection against dust and a dripproof structure will be realized with a miniaturization.

[0011] In each above-mentioned invention, if resin applies polyamide system adhesives or polyurethane adhesive, low-pressure molding is possible, and there is little effect of heat or a pressure to a middle finished product, and it can also constitute metal mold cheaply.

[0012] Moreover, by adjusting so that the degree of hardness after hardening may become low, an impact absorption effect arises on a sheathing object, and resin can protect a middle finished product from the impact by fall etc.

[0013] Moreover, if the circuit board in which two or more input/output terminals were formed is applied to the cell pack combined with one while an electric product constitutes the cell protection network which protects a rechargeable battery and this rechargeable battery from overcharge, overdischarge, etc., it will become suitable as a power source of pocket electronic equipment by protection against dust and the dripproof structure with a miniaturization.

[0014] [Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to an accompanying drawing, and an understanding of this invention is presented. In addition, the operation gestalt shown below is an example which materialized this invention, and does not limit the technical range of this invention.

[0015] The operation gestalt shown below is what shows the example which applied the sheathing object formation approach of this invention to the pack case (sheathing object) of a cell pack (electric product). The rechargeable battery 1 constituted by the rechargeable lithium-ion battery of a flat form as shown in drawing 1 . The circuit board 9 which constituted the cell protection network which protects this rechargeable battery 1 from overcharge, overdischarge, etc. is combined with one. The middle finished product 50 as shown in drawing 2 is formed, this middle finished product 50 is held in the pack case 7, as shown in drawing 3 , and it constitutes in a cell pack, without spoiling the gestalt of a rechargeable battery 1.

[0016] Drawing 1 is what disassembles and shows said middle finished product 50. To the obturation section side of a rechargeable battery 1 The circuit board 9 which formed the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 while constituting the connection plate 11 joined to

the positive-electrode terminal 25 of this rechargeable battery 1, the spacer 12 which is arranged on a rechargeable battery 1 and offers the bearing surface of the circuit board 9, and the cell protection network is arranged. The lead plate 10 which extends on a side face from the base of the cell can 31 which constitutes the negative electrode of a rechargeable battery 1 is arranged.

[0017] Base 11b of the connection plate 11 formed in the shape of [of L] a character is joined to the positive-electrode terminal 25 of said rechargeable battery 1, base 10b of the lead plate 10 is joined to the base of the cell can 31, and lead section 10a extends to an obturation section side along the side face of the cell can 31.

[0018] Moreover, a spacer 12 is attached in the obturation section side of a rechargeable battery 1 as shown in drawing 2. Positioning fitting of the spacer 12 is carried out on a rechargeable battery 1, and the insulation between the cell cans 31 which are negative electrodes is strengthened. Moreover, lead section 11a of the connection plate 11 and lead section 10a of the lead plate 10 are joined on the circuit board 9 through a spacer 12 and the circuit board 9. Since the electronic parts mounted in the obturation section side of the circuit board 9 are held in the opening circles of a spacer 12, it will be in the condition that the laminating was carried out on the rechargeable battery 1, only in the height to which the circuit board 9 applied the thickness of the substrate, and the thickness of a spacer 12, and the increment in the height by preparing a cell protection network will be controlled.

[0019] Drawing 4 is what indicated the circuit pattern formed in front flesh-side both sides of the circuit board 9, and the electronic parts with which this is equipped in perspective drawing, and the cell protection network and the input/output terminal are constituted on the substrate. As are shown in drawing 4 (b), and the cell protection network where the IC components 21 and 22 and a chip 26 were mounted in the rear-face side (spacer 12 side) of the circuit board 9 is constituted and it is shown in drawing 4 (a) Conductor pattern 16a for lead plates for connecting the conductor pattern 15 for connection plates and the lead plate 10 for connecting the connection plate 11 with the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 is formed in the front-face side. The circuit pattern formed in these both sides is connected by the through hole 30 at the key point. From the lead run through hole 20 formed in this circuit board 9, through and lead section 11a are bent on the conductor pattern 15 for connection plates, and lead section 11a of the connection plate 11 is soldered. Moreover, lead section 10a of the lead plate 10 is bent and soldered to the lead plate through crevices 29 and 29 formed in the both ends of the circuit board 9 on through and conductor pattern 16a for lead plates. By soldering this connection plate 11 and the lead plate 10, the circuit board 9 is fixed on a spacer 12. In addition, although the lead plate 10 is formed only in one side, it can prepare in both sides, and can also join to the circuit board 9, and it can make immobilization of the circuit board 9 more reliable.

[0020] As shown in drawing 4 (a), on the plus terminal 4 and conductor pattern 5a for minus terminals, the temperature detection terminal 6 is joined at the conductor pattern 4a top for plus terminals formed in the front-face side of the circuit board 9 on the minus terminal 5 and conductor pattern 6a for temperature detection terminals. These terminals become the thing excellent in conductivity, junction nature, and corrosion resistance by using the plate of a copper-nickel alloy, or the clad plate of the plate of this copper-nickel alloy, and stainless steel. Moreover, without joining a plate as a terminal, it can gold-plate at each conductor pattern, and can also use as a terminal as it is.

[0021] By attaching the circuit board 9 in a rechargeable battery 1 as mentioned above, as shown in drawing 2, the middle finished product 50 is formed. This middle finished product 50 is held in the pack case 7, as shown in drawing 3. the 1- which shows this pack case 7 below -- it can constitute like each 5th example.

(The 1st example) By the content volume corresponding to the dimension configuration of the pack case 7 The middle finished product 50 is arranged in the hollow condition by thin supporter material in the location corresponding to the plus terminal 4 in the metal mold which prepared the lobe for forming each opening of the temperature detection terminal aperture 36 in the location corresponding to the plus terminal aperture 34 and the minus terminal 5 in the location corresponding to the minus terminal aperture 35 and the temperature detection terminal 6. The resin changed into the melting condition is poured in into metal mold.

[0022] The gap between metal mold and the middle finished product 50 is filled up with the resin poured in since the middle finished product 50 was only integral construction with few clearances. If it takes out from metal mold after stiffening resin, as shown in drawing 3, the pack case 7 which prepared each opening of the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 in the location corresponding to the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6, and covered the perimeter of the middle finished product 50 will be formed.

[0023] With this configuration, since the pack case 7 is constituted by integral construction, it can be

formed in a thin sheathing object, and it can attain miniaturization and lightweight-ization as a cell pack. Moreover, since the resin with which the perimeter of the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 was filled up pastes up, the inside of the pack case 7 is sealed completely, and can raise protection-against-dust nature and dripproofness.

(The 2nd example) As shown in drawing 5, the drum case (sheathing case) 51 is formed so that the depth H may become long a little from the overall length of the middle finished product 50 in a closed-end rectangular pipe configuration with resin shaping. As shown in the base of this drum case 51 at drawing 5 (a), each opening of the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 is formed in the location corresponding to the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 of the middle finished product 50.

[0024] The middle finished product 50 is inserted into this drum case 51, and the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 are exposed outside from each opening of the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36. Subsequently, it is made to harden after filling up the open end of the drum case 51 with the resin of a melting condition.

[0025] The pack case 7 formed as mentioned above is formed in the condition of having prepared each opening of the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 in the location corresponding to the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6, and having covered the perimeter of the middle finished product 50 as shown in drawing 3.

(The 3rd example) Drawing 6 (a) As shown in – (c), the drum case 52 is formed in a closed-end rectangular pipe configuration with resin shaping. Into this drum case 52, as that circuit board 9 is on an open end side, it inserts the middle finished product 50. Then, after arranging the metal mold for forming the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 in the open end of the drum case 52, and closing an open end and filling up the space of an opening edge with the resin of a melting condition, as this is stiffened and it is shown in drawing 6 (d), the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 are formed.

[0026] The pack case 7 which was made to expose the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 outside, respectively from the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36, and covered the perimeter of the middle finished product 50 with the closure of the opening edge of this drum case 52 as shown in drawing 3 is formed.

[0027] With this configuration, since the resin with which the perimeter of the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 was filled up pastes up, the inside of the pack case 7 is sealed completely, and can raise protection-against-dust nature and dripproofness.

(The 4th example) Drawing 7 (a) As shown in – (c), the drum case 53 which formed the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 in one short side face is formed with resin shaping in the closed-end rectangular pipe configuration where one long side face of a rectangular parallelepiped was opened wide. The middle finished product 50 is inserted from that side face into this drum case 52, and the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 are exposed outside, respectively from the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36. Then, in order to close the open end of the drum case 53, the space of an open end is filled up with the resin of a melting condition, and this is stiffened.

[0028] The pack case 7 which was made to expose the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 outside, respectively from the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36, and covered the perimeter of the middle finished product 50 with the closure of the open end of this drum case 53 as shown in drawing 3 is formed.

(The 5th example) As shown in drawing 8 (a), the middle finished product 50 is inserted in the drum case 54 of the rectangular pipe configuration formed by resin shaping, and the open end formed in the both sides of the drum case 54 is closed. The side used as a base is filled up with the resin fused like the 1st example, and the side used as a top face is filled up with the resin which formed and fused the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 so that the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 might be outside exposed like the 2nd example.

[0029] The pack case 7 which was made to expose the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 outside, respectively from the plus terminal aperture 34, the minus

terminal aperture 35, and the temperature detection terminal aperture 36, and covered the perimeter of the middle finished product 50 with the closure of the both ends of this drum case 54 as shown in drawing 3 is formed.

[0030] In the above 1st – the 5th example, the resin with which it is filled up can apply thermoplastic adhesives, such as a polyamide system or a polyurethane system, thermosetting adhesive, and hot melt system adhesives. If curing temperature applies a low thing or the thing which carries out room temperature setting in melting temperature and thermosetting adhesive in thermoplastic adhesive, the thermal effect to the middle finished product 50 can be made to mitigate. Moreover, by using the adhesives which can carry out low-pressure molding, there is little effect of a pressure to the middle finished product 50, and it can constitute metal mold cheaply.

[0031] moreover, the 2– with the configuration shown in each 5th example, since the resin with which it filled up between the drum cases 51–54 and the middle finished product 50 flows, even if it forms the thickness of the drum cases 51–54 thinly, the reinforcement is compensated and the reinforcement as a cell pack can be raised.

[0032] Moreover, by adjusting so that the degree of hardness when stiffening resin may become low, the effectiveness of an impact absorption is acquired, the shock resistance to impacts, such as fall, improves in a cell pack, and it will become suitable as a power source of pocket electronic equipment.

[0033]

[Effect of the Invention] Since the sheathing object of an electric product can be thinly constituted as the above explanation according to this invention, a miniaturization can be raised and improvement in reinforcement can be aimed at with the resin with which it is filled up. Moreover, since sealing structure can constitute in protection against dust and a dripproof structure, it becomes a suitable thing to apply to pocket electronic equipment etc.

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TECHNICAL FIELD

[Field of the Invention] This invention is filled up with the resin which carried out melting so that the component of an electric product might be covered, and relates to the sheathing object formation approach of the electric product which forms the sheathing object of an electric product with the stiffened resin.

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PRIOR ART

[Description of the Prior Art] There is no operating environment uniformly, and an electric product like pocket electronic equipment requires protection against dust, a dripproof structure or fall-proof, and shock resistance at the same time a miniaturization, thin-shape-izing, and lightweight-ization are required, since it is accompanied by migration. In order to fill these demands, the structure of the sheathing object of an electric product serves as an important element. Drawing 9 is an example of an electric product, it shows the example of a configuration of the cell pack used as a power source of pocket electronic equipment, held a rechargeable battery 60 and the circuit board 64 which constituted the cell protection network etc. in the sheathing inside of the body, and has met the demand as a power source of pocket electronic equipment.

[0003] The sheathing object of this cell pack consists of pack cases which consist of a bottom case 62 and an upper case 63. As are shown in drawing 9 (a), and the circuit board 64 which constituted the cell protection network in the bottom case 62, an input/output terminal, a connection plate, etc. are arranged and it is shown on it at drawing 9 (b), the rechargeable battery 60 constituted as a rechargeable lithium-ion battery is arranged, and a rechargeable battery 60 is joined to a connection plate. As shown in drawing 9 (c), a double-sided tape 65 is stuck on a cell 60, the upper case 63 is joined to the bottom case 62, and a cell pack is completed.

[0004] Junction in said bottom case 62 and the upper case 63 is made by ultrasonic jointing in both periphery section. As shown in drawing 10, lobe 62a formed in the periphery section of the bottom case 62 is made to insert in crevice 63a formed in the periphery section of the upper case 63, and ultrasonic welding is carried out between the tip of lobe 62a, and the bottom of crevice 63a. The resin fused according to this junction structure is not outside exposed.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since the sheathing object of an electric product can be thinly constituted as the above explanation according to this invention, a miniaturization can be raised and improvement in reinforcement can be aimed at with the resin with which it is filled up. Moreover, since sealing structure can constitute in protection against dust and a dripproof structure, it becomes a suitable thing to apply to pocket electronic equipment etc.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, with the configuration of the conventional sheathing object, the structure which joins the divided case was indispensable, and in order to join the upper case 63 to the bottom case 62 in the above-mentioned conventional example, the thickness of the side peripheral surface of both the cases 62 and 63 was needed, and the technical problem by which the increase of the volume as a pack case, i.e., a cell pack, and the increase of weight are accompanied occurred.

[0006] Moreover, the pack case was a hard case, in order to join the upper case 63 to the bottom case 62 and to expose an input/output terminal outside, it was difficult for a minute clearance to occur everywhere and to constitute in protection against dust and a dripproof structure, and it was the structure which is easy to damage by fall.

[0007] The target place has this invention in offering the sheathing object formation approach of an electric product of covering the internal configuration element of an electric product without a clearance with a thin sheathing object, and realizing protection against dust and a dripproof structure with a miniaturization and lightweight-ization.

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MEANS

[Means for Solving the Problem] The sheathing object formation approach of the electric product concerning the 1st invention of this application for attaining the above-mentioned purpose Combine two or more components with one, prepare an external connection terminal outside, form the middle finished product of an electric product, and this middle finished product is arranged in metal mold. It be what be characterize by form a sheathing object in a predetermined dimension configuration by stiffen the resin with which be filled up with the resin of a melting condition and it be filled up in metal mold so that opening might be formed on said external connection terminal and the whole surface might be covered with resin . Since the middle finished product which is the internal configuration element of an electric product is covered with resin, without preparing a joint, the volume of a sheathing object can be formed in the lower limit, and can achieve the miniaturization of an electric product.

[0009] Moreover, the sheathing object formation approach of the electric product concerning the 2nd invention of this application Combine two or more components with one, prepare an external connection terminal outside, and the middle finished product of an electric product is formed. Into the sheathing case where the open section was formed, as said external connection terminal is located, said middle finished product is inserted in said open section side. It is what is characterized by making the open section harden the resin with which was filled up with the resin of a melting condition and it was filled up, and closing the open section of a sheathing case so that opening may be formed on an external connection terminal and the closure of said open section may be carried out by resin. A middle finished product is covered in a sheathing case except for the forming face of an external connection terminal, if opening is prepared in the location of an external connection terminal and the open section of this sheathing case is closed by resin, a sheathing object will be formed in sealing structure and protection against dust and a dripproof structure will be realized with a miniaturization.

[0010] Moreover, the sheathing object formation approach of the electric product concerning the 3rd invention of this application Combine two or more components with one, prepare an external connection terminal outside, and the middle finished product of an electric product is formed. Opening is prepared in the location corresponding to said external connection terminal, and said middle finished product is inserted from said open section into the sheathing case where the open section was formed in the direction of arbitration. It is what is characterized by making the open section harden the resin with which was filled up with the resin of a melting condition and it was filled up, and closing the open section of a sheathing case. Since a middle finished product is covered in a sheathing case except for the open section and an external connection terminal is exposed outside from opening of a sheathing case, if the open section is closed by resin, a sheathing object will be formed in sealing structure and protection against dust and a dripproof structure will be realized with a miniaturization.

[0011] In each above-mentioned invention, if resin applies polyamide system adhesives or polyurethane adhesive, low-pressure molding is possible, and there is little effect of heat or a pressure to a middle finished product, and it can also constitute metal mold cheaply.

[0012] Moreover, by adjusting so that the degree of hardness after hardening may become low, an impact absorption effect arises on a sheathing object, and resin can protect a middle finished product from the impact by fall etc.

[0013] Moreover, if the circuit board in which two or more input/output terminals were formed is applied to the cell pack combined with one while an electric product constitutes the cell protection network which protects a rechargeable battery and this rechargeable battery from overcharge, overdischarge, etc., it will become suitable as a power source of pocket electronic equipment by protection against dust and the dripproof structure with a miniaturization.

[0014]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to an accompanying drawing, and an understanding of this invention is presented. In addition, the operation gestalt shown below is an example which materialized this invention, and does not limit the technical range of this invention.

[0015] The operation gestalt shown below is what shows the example which applied the sheathing object formation approach of this invention to the pack case (sheathing object) of a cell pack (electric product). The rechargeable battery 1 constituted by the rechargeable lithium-ion battery of a flat form as shown in drawing 1. The circuit board 9 which constituted the cell protection network which protects this rechargeable battery 1 from overcharge, overdischarge, etc. is combined with one. The middle finished product 50 as shown in drawing 2 is formed, this middle finished product 50 is held in the pack case 7, as shown in drawing 3, and it constitutes in a cell pack, without spoiling the gestalt of a rechargeable battery 1.

[0016] Drawing 1 is what disassembles and shows said middle finished product 50. To the obturation section side of a rechargeable battery 1 The circuit board 9 which formed the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 while constituting the connection plate 11 joined to the positive-electrode terminal 25 of this rechargeable battery 1, the spacer 12 which is arranged on a rechargeable battery 1 and offers the bearing surface of the circuit board 9, and the cell protection network is arranged. The lead plate 10 which extends on a side face from the base of the cell can 31 which constitutes the negative electrode of a rechargeable battery 1 is arranged.

[0017] Base 11b of the connection plate 11 formed in the shape of [of L] a character is joined to the positive-electrode terminal 25 of said rechargeable battery 1, base 10b of the lead plate 10 is joined to the base of the cell can 31, and lead section 10a extends to an obturation section side along the side face of the cell can 31.

[0018] Moreover, a spacer 12 is attached in the obturation section side of a rechargeable battery 1 as shown in drawing 2. Positioning fitting of the spacer 12 is carried out on a rechargeable battery 1, and the insulation between the cell cans 31 which are negative electrodes is strengthened. Moreover, lead section 11a of the connection plate 11 and lead section 10a of the lead plate 10 are joined on the circuit board 9 through a spacer 12 and the circuit board 9. Since the electronic parts mounted in the obturation section side of the circuit board 9 are held in the opening circles of a spacer 12, it will be in the condition that the laminating was carried out on the rechargeable battery 1, only in the height to which the circuit board 9 applied the thickness of the substrate, and the thickness of a spacer 12, and the increment in the height by preparing a cell protection network will be controlled.

[0019] Drawing 4 is what indicated the circuit pattern formed in front flesh-side both sides of the circuit board 9, and the electronic parts with which this is equipped in perspective drawing, and the cell protection network and the input/output terminal are constituted on the substrate. As are shown in drawing 4 (b), and the cell protection network where the IC components 21 and 22 and a chip 26 were mounted in the rear-face side (spacer 12 side) of the circuit board 9 is constituted and it is shown in drawing 4 (a) Conductor pattern 16a for lead plates for connecting the conductor pattern 15 for connection plates and the lead plate 10 for connecting the connection plate 11 with the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 is formed in the front-face side. The circuit pattern formed in these both sides is connected by the through hole 30 at the key point. From the lead run through hole 20 formed in this circuit board 9, through and lead section 11a are bent on the conductor pattern 15 for connection plates, and lead section 11a of the connection plate 11 is soldered. Moreover, lead section 10a of the lead plate 10 is bent and soldered to the lead plate through crevices 29 and 29 formed in the both ends of the circuit board 9 on through and conductor pattern 16a for lead plates. By soldering this connection plate 11 and the lead plate 10, the circuit board 9 is fixed on a spacer 12. In addition, although the lead plate 10 is formed only in one side, it can prepare in both sides, and can also join to the circuit board 9, and it can make immobilization of the circuit board 9 more reliable.

[0020] As shown in drawing 4 (a), on the plus terminal 4 and conductor pattern 5a for minus terminals, the temperature detection terminal 6 is joined at the conductor pattern 4a top for plus terminals formed in the front-face side of the circuit board 9 on the minus terminal 5 and conductor pattern 6a for temperature detection terminals. These terminals become the thing excellent in conductivity, junction nature, and corrosion resistance by using the plate of a copper-nickel alloy, or the clad plate of the plate of this copper-nickel alloy, and stainless steel. Moreover, without joining a plate as a terminal, it can gold-plate at each conductor pattern, and can also use as a terminal as it is.

[0021] By attaching the circuit board 9 in a rechargeable battery 1 as mentioned above, as shown in drawing 2, the middle finished product 50 is formed. This middle finished product 50 is held in the pack case 7, as shown in drawing 3. the 1- which shows this pack case 7 below -- it can constitute like each 5th example.

[Translation done.]

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EXAMPLE

(The 1st example) By the content volume corresponding to the dimension configuration of the pack case 7 The middle finished product 50 is arranged in the hollow condition by thin supporter material in the location corresponding to the plus terminal 4 in the metal mold which prepared the lobe for forming each opening of the temperature detection terminal aperture 36 in the location corresponding to the plus terminal aperture 34 and the minus terminal 5 in the location corresponding to the minus terminal aperture 35 and the temperature detection terminal 6. The resin changed into the melting condition is poured in into metal mold.

[0022] The gap between metal mold and the middle finished product 50 is filled up with the resin poured in since the middle finished product 50 was only integral construction with few clearances. If it takes out from metal mold after stiffening resin, as shown in drawing 3, the pack case 7 which prepared each opening of the plus terminal aperture 34, the minus terminal aperture 35, and the temperature detection terminal aperture 36 in the location corresponding to the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6, and covered the perimeter of the middle finished product 50 will be formed.

[0023] With this configuration, since the pack case 7 is constituted by integral construction, it can be formed in a thin sheathing object, and it can attain miniaturization and lightweight-ization as a cell pack. Moreover, since the resin with which the perimeter of the plus terminal 4, the minus terminal 5, and the temperature detection terminal 6 was filled up pastes up, the inside of the pack case 7 is sealed completely, and can raise protection-against-dust nature and dripproofness.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The decomposition perspective view showing the configuration of the middle finished product concerning an operation gestalt.

[Drawing 2] (a) which shows the configuration of a middle finished product is a top view, and (b) is a side elevation.

[Drawing 3] The perspective view showing the completion condition of a cell pack.

[Drawing 4] (a) which shows the configuration of the circuit board is a front-face side, and (b) is a top view by the side of a rear face.

[Drawing 5] For a plan and (b), a side elevation and (c) are [(a) of the drum case concerning the 2nd example which forms a pack case] a bottom view.

[Drawing 6] For (b), (a) of the drum case concerning the 3rd example which forms a pack case is a plan and a plan in the condition that a side elevation and (c) closed the bottom view, and (d) closed the top face.

[Drawing 7] For a plan and (b), a side elevation and (c) are [(a) of the drum case concerning the 4th example which forms a pack case] the top view of the open section.

[Drawing 8] (c) is a plan in the condition that (a) of the drum case concerning the 5th example which forms a pack case closed the side elevation, and (b) closed the top face, and a bottom view in the condition of having closed the base.

[Drawing 9] The perspective view showing the configuration of the cell pack which becomes a configuration conventionally.

[Drawing 10] The fragmentary sectional view showing the junction condition of the pack case which becomes a configuration conventionally.

[Description of Notations]

1 Rechargeable Battery

4 Plus Terminal (External Connection Terminal)

5 Minus Terminal (External Connection Terminal)

6 Temperature Detection Terminal (External Connection Terminal)

7 Pack Case

34 Plus Terminal Aperture (Opening)

35 Minus Terminal Aperture (Opening)

36 Temperature Detection Terminal Aperture (Opening)

50 Middle Finished Product

51-54 Drum case (sheathing case)

[Translation done.]

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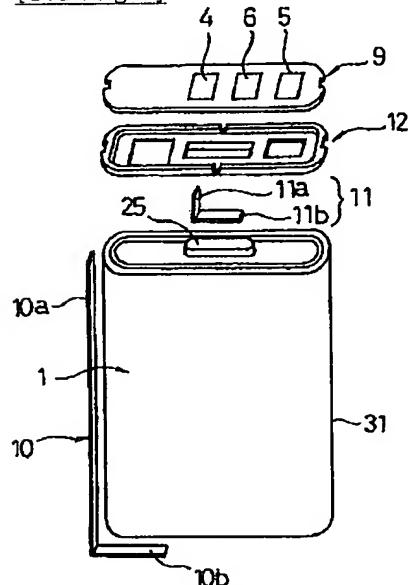
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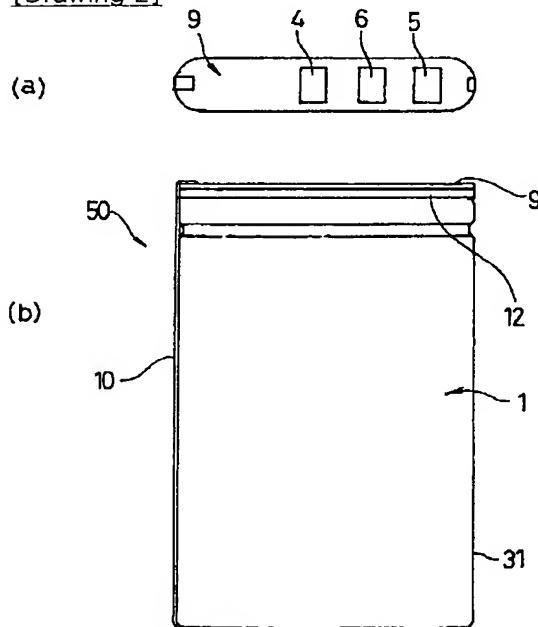
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DRAWINGS

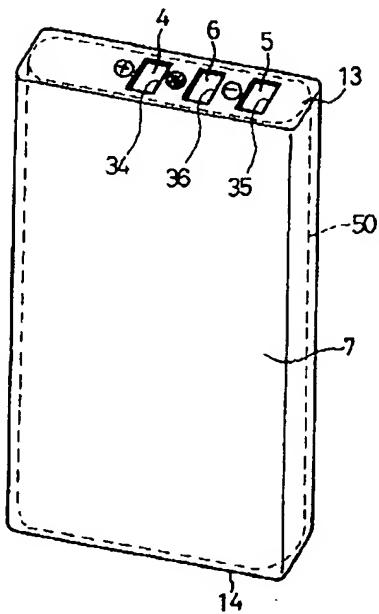
[Drawing 1]



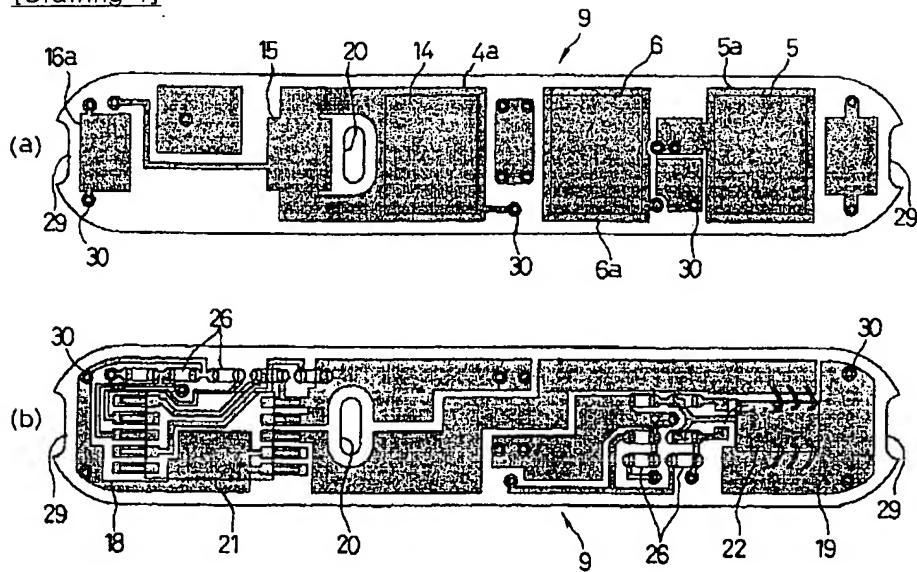
[Drawing 2]



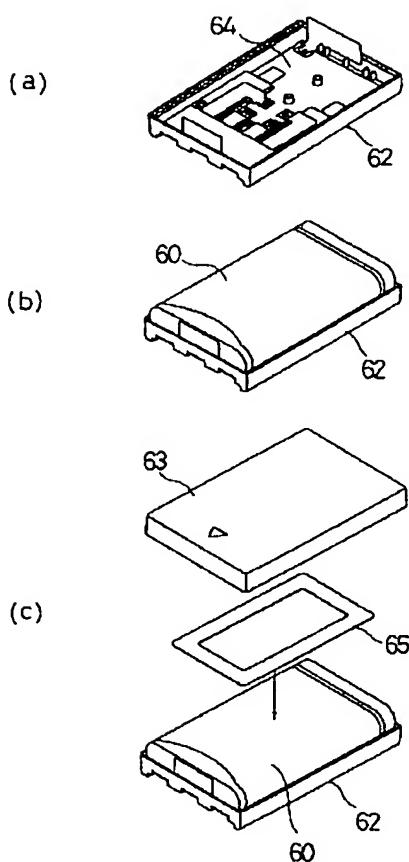
[Drawing 3]



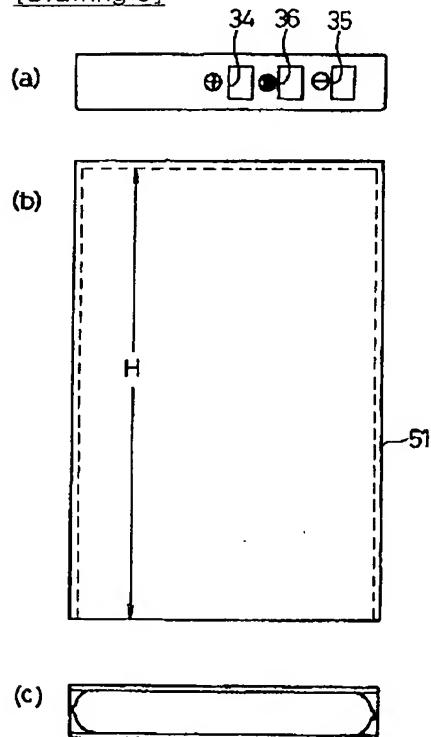
[Drawing 4]



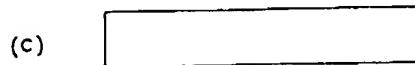
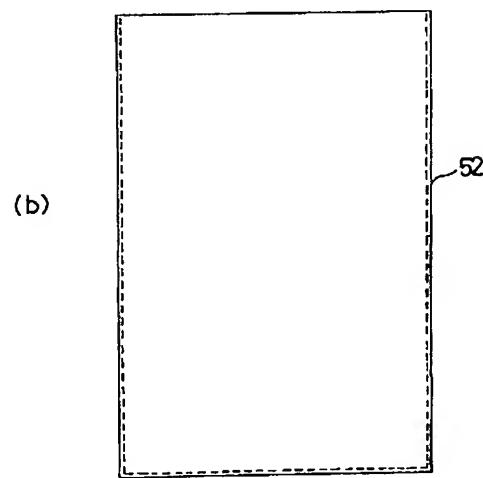
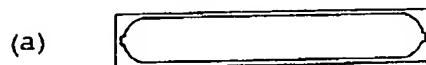
[Drawing 9]



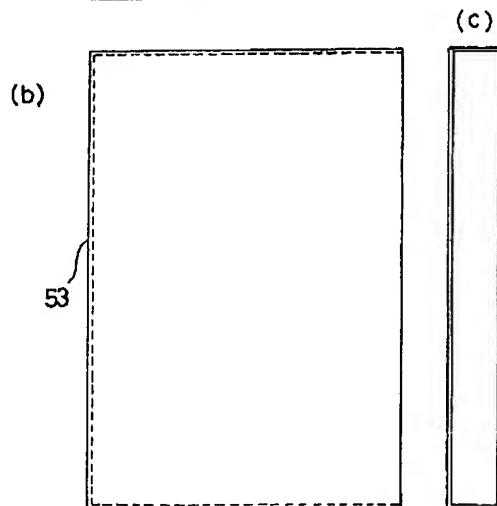
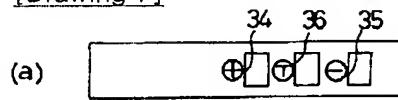
[Drawing 5]



[Drawing 6]

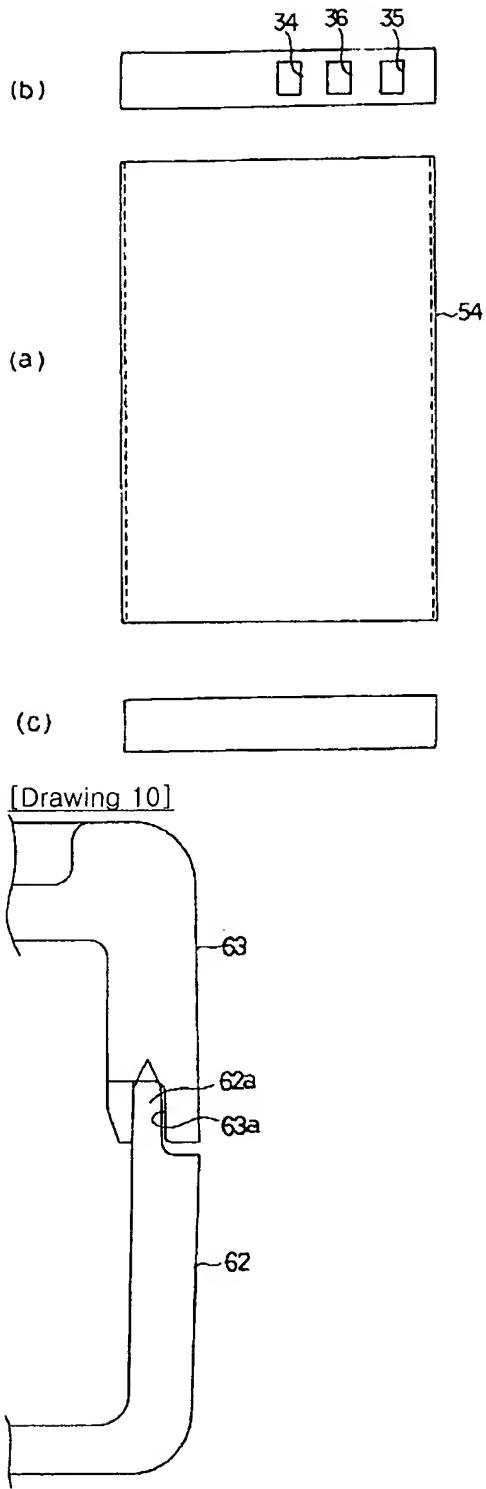


[Drawing 7]



(c)

[Drawing 8]



[Translation done.]